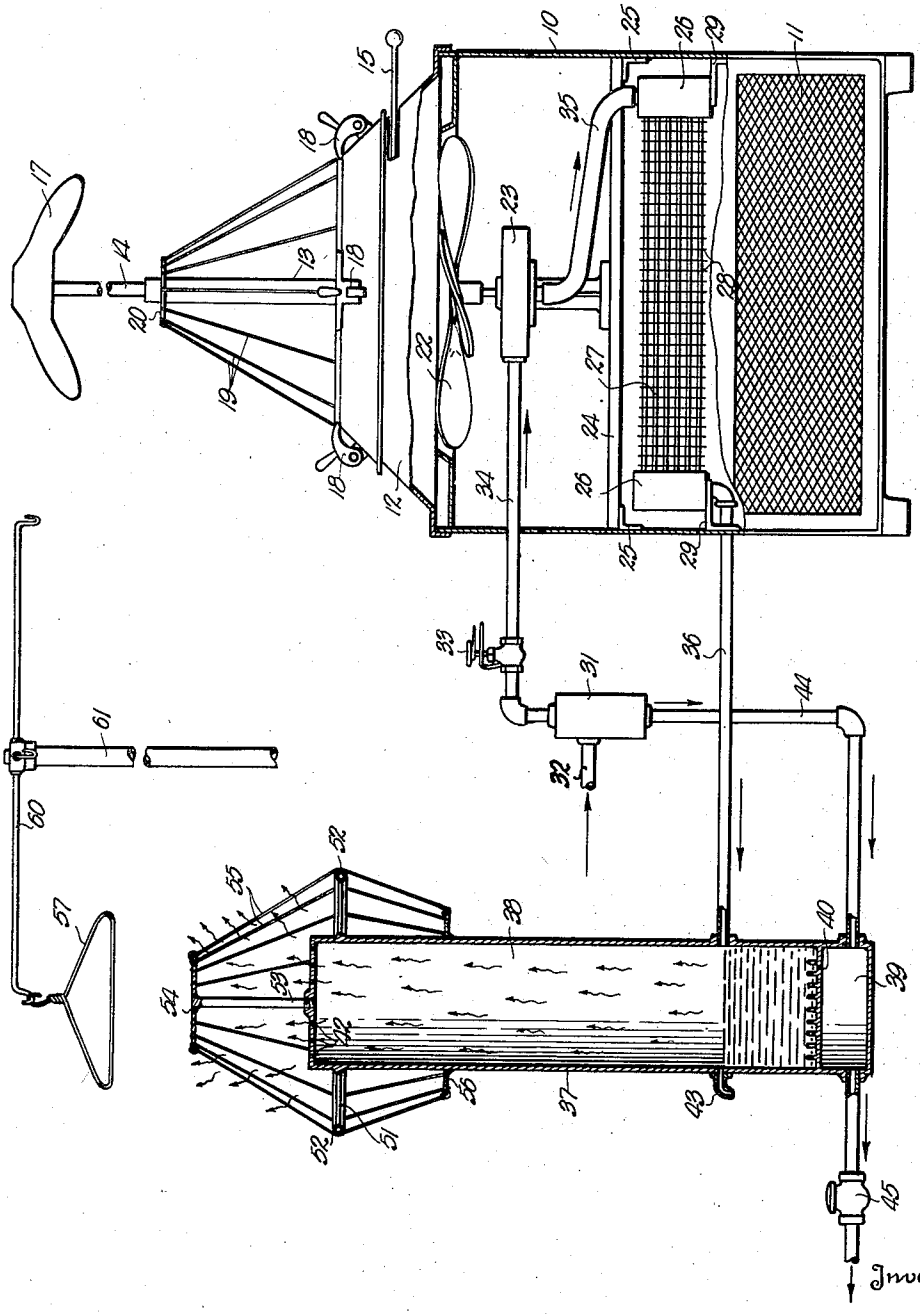
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GARMENT FINISHING APPARATUS

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GARMENT FINISHING APPARATUS

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The present invention relates in general to garment finishing machines and it deals more particularly with improved apparatus for steaming and drying garments.

Devices of this character are widely used in the dry cleaning industry and have been shown and described in my prior Patents 2,214,923, dated September 17, 1940, and 2,241,702, dated May 13, 1941. Broadly speaking, the machines are designed to produce an upward blast of steam or air over which a garment is adapted to be hung after it has gone through the wet or dry cleaning operation, the current of moisture or drying air which passes through the fabric serving to remove wrinkles, moisture and solvent odors, raise the nap and restore the shape of the garment.

In the past it has been customary to employ fans driven by electric motors in order to generate the air blast and one of the objects of the present invention is to do away with such motors thereby to eliminate electrical installation expense and prevent the equipment from being disabled by failure of the power source or other electrical trouble. Another object is to utilize steam power for generating the air blast and also for heating the air.

To remove wrinkles from garments, it is important that the steam which passes through the fabric be very wet and a further object of the invention is to provide an improved arrangement for generating steam containing the requisite moisture.

Other and further objects will apear in the course of the following description of the invention.

Referring to the drawing which shows my system with parts of the apparatus cut away or in section for purposes of illustration, the drier unit comprises a generally rectangular enclosure or housing 10 having a screen covered intake opening 11 in one side and a frusto-conical exhaust duct 12 at the top. A rigid hollow support 13 extends upwardly from the center of the exhaust duct and slidably mounted therein is an elongated vertical post 14. Vertical adjustment of the post is controlled by a lever 15 through mechanism forming no part of the present invention.

Garments to be dried are adapted to be hung on a shoulder-shaped cross member 17 at the top of the post, the bottom hem of the garment being clamped to the rim of the exhaust duct by means of spring-biased clamps 18. A series of cords 19, converging upwardly from the rim of the duct and having their upper ends fastened in holes in

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an annular flange 20 on the support 13, form garment guides which keep the lower portion of the garment from entering the mouth of the duct.

A fan or blower 22 adapted to be driven by a turbine 23 stands on a channel 24, the channel being suppported at its ends by angle members 25 bolted or welded to the walls of the enclosure. Below the fan is a radiator or heat exchange device comprising a pair of manifolds 26 connected by parallel tubes 27, the radiating surface of which is increased by fins 28. The radiator is supported by angles 29 secured to the side walls of the housing.

The numeral 31 identifies a steam separator of conventional character, steam being supplied thereto under pressure via line 32. When valve 33 is opened high pressure dry steam from the separator passes through line 34 into the turbine, expands through the blades thereof in well-known fashion to drive fan 22 and leaves the turbine through line 35; then it enters the radiator and after passing therethrough the spent steam and condensate flows through line 36 into the condensate reclaim tank 37 of my garment steamer. It will be seen that the latter tank is open to the atmosphere so that there is substantially zero back pressure on the turbine at all times.

The speed of the fan is controlled by adjusting the turbine steam inlet valve 33 and as it turns it draws air through the inlet 11 thence through the radiator where it is heated by heat exchange with the steam flowing through the radiator and discharges the resultant hot blast of air upwardly into the garment disposed over the exhaust duct as hereinbefore described.

Turning to a consideration of my garment steamer, this is essentially a cylindrical tank 37 divided into an upper chamber 38 and a lower chamber 39 by a horizontal partition 40 having fins or the like on one or both faces to improve the exchange of heat between the two chambers. The upper end of the tank contains perforations 42 and an overflow 43 is provided in the upper chamber. Lower chamber 39 is connected to the bottom of separator 31 by pipe 44 and has a conventional trap 45 insuring that said chamber is constantly charged with hot wet steam at high pressure from the separator. Condensate reaching the upper chamber 38 through pipe 36 along with the low pressure steam from the radiator is adapted to be reboiled by contact with the heated member 40 resulting in very wet low pressure steam which leaves the upper end of the tank through perforations 42. Instead of employing partition 40, it will be appreciated that a heat

exchanger coil or the like could be immersed directly in the condensate collecting in chamber 38, one end of the coil being connected to line 44 and the other end to trap 45 to achieve the same result as described.

Encircling the condensate reclaim tank and supported thereon by radial arms 51 is a ring 52. A post 53 extends upwardly from the top of the tank supporting a flat horizontal disk 54 which has holes around its periphery. Cords 55 threaded through these holes are stretched taut over the ring 52 and have their lower ends attached to an annular flange 56 welded to the tank, the flange also being provided with holes around its periphery for receiving the cords. The upwardly converging cords form a guide for maintaining the lower hem of a garment spaced laterally from the tank when the garment is arranged on a hanger 57 and it should be noted that with the garment hung in this position disk 54 also serves as a spreader deflecting the ascending steam upwardly against the fabric.

Any suitable arrangement for supporting the garment hanger 57 over the steamer may be employed. It is preferred to use a support having radial arms 60 arranged to turn about a horizontal post 61 so that while one garment is being steamed another can be hung on the adjacent arm in readiness to be brought over the steamer. When the steamed garment is turned away from the steaming position it is lifted onto member 17 and dried by the air blast as hereinbefore described. The steam admitted through valve 33 for purposes of drying the garment hung on member 17 also serves to steam the garment hung over the steamer.

From the foregoing it will be seen that this invention is one well adapted to attain all of the ends and objects hereinbefore set forth together with other advantages which are obvious and which are inherent to the apparatus.

The fan is driven without an electrical motor obviating electrical maintenance and power supply troubles; the turbine drive has unlimited flexibility as to speed and it derives its power from the same steam supply as is used for heating the air and steaming the garments, this arrangement greatly simplifying installation and minimizing the expense of the system.

The turbine and radiator also serve to deliver to the garment steamer a wet low pressure steam much better adapted for the desired purpose than the steam originally available at the supply line. The condensate carried into the garment steamer tank is boiled at atmospheric pressure by heat exchange with the high pressure steam from the source and the vigorous bubbling which takes place in that process adds further moisture to the steam.

It will be understood that certain features and subcombinations of the invention are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

Inasmuch as various embodiments of the invention may be made without departing from the scope thereof, it should be understood that all matter herein set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. Garment finishing apparatus comprising a garment drier housing having a discharge opening over which a garment is adapted to be supported, a fan in the housing for discharging air through said opening into the garment, a turbine mechanically connected to the fan, means for supplying steam to the turbine to drive the turbine and fan, a radiator supported in the path of the air moved through the housing by the fan, means for exhausting spent steam from the turbine into the radiator for heating the air, a garment steamer comprising an open top receptacle over which a garment is adapted to be suspended, and means for discharging spent steam and condensate from said radiator into said receptacle.

2. Garment finishing apparatus comprising a garment drier housing having a discharge opening over which a garment is adapted to be supported, a fan in the housing for discharging air through said opening into the garment, a turbine mechanically connected to the fan, means for supplying steam to the turbine to drive the turbine and fan, a radiator supported in the path of the air moved through the housing by the fan, means for exhausing spent steam from the turbine into the radiator for heating the air, a garment steamer comprising an open-top receptacle over which a garment is adapted to be suspended, means for discharging spent steam and condensate from said radiator into said receptacle, a duct charged with steam under pressure, and a heat exchange connection in said receptacle between said duct and the condensate discharged from the radiator.

3. In combination, an air duct having a blower associated therewith, a steam turbine mechanically connected to the blower, a source of steam pressure connected to the turbine thereby to operate same and cause the blower to force air through said duct, a radiator in the duct connected to the turbine exhaust to receive spent steam therefrom and to bring same into heat exchange relationship with the air moving through the duct, said radiator having a fluid exhaust conduit extending outside of said duct, a second conduit charged with steam under pressure from said source, and a heat exchange connection between the two conduits whereby the fluid leaving said radiator is reheated by steam from said source.

4. A combination as in claim 3 wherein said radiator's fluid exhaust conduit opens to the atmosphere outside of said duct.

5. In combination, an air duct having a blower associated therewith, a steam turbine connected to the blower for driving same, a source of steam, a steam separator connected to said source, said separator having a dry steam outlet and a wet steam outlet, a pipe from the dry steam outlet supplying steam to said turbine thereby to drive the turbine and cause the blower to force air through the duct, a radiator in the air duct connected to the turbine exhaust to receive spent steam therefrom and thus heat the air passing through the duct, said radiator having a fluid drain, a receptacle connected to the drain for receiving fluid from the radiator, and a duct from the wet steam outlet of the separator passing in heat exchange relationship to the fluid in the receptacle received from said radiator.

6. A garment steamer, comprising a source of steam pressure, a steam separator connected to said source, said separator having a dry steam outlet and a wet steam outlet, a receptacle having a bottom and side walls but open at the top to the atmosphere, a pipe connection from the dry steam outlet of the separator to said re-

ceptacle, a pressure reduction device and a condenser in said connection for transforming the dry steam into low pressure wet steam and condensate en route to said receptacle, and a steam connection from the wet steam outlet of the separator to said receptacle, said last connection passing in heat exchange relationship to the fluid reaching said receptacle through said first connection.

7. A garment steamer as in claim 6 wherein said pressure reduction device comprises a turbine.

8. A garment steamer as in claim 6 wherein said pressure reduction device comprises a turbine driving a fan arranged to circulate air over said thermal condenser thereby to increase the rate of condensation.

9. A garment steamer comprising a source of steam pressure, a steam separator connected to said source, said separator having a dry steam outlet and a wet steam outlet, a receptacle having a bottom and side walls but open at the top, a pipe connection from the dry steam outlet of the separator to said receptacle, a pressure reduction device and a condenser in said connection for transforming the dry steam into low pressure wet steam and condensate enroute to said receptacle, a horizontal plate mounted on the receptacle in vertically spaced relationship above the open top thereof to spread the steam ascending from said receptacle and a steam connection to said receptacle from the wet steam outlet of the separator, said last connection passing in heat exchange relationship to fluid reaching the receptacle through said first connection.

10. A garment steamer as in claim 9 having a ring mounted on the receptacle in radially spaced relationship thereto, and upwardly converging filaments extending from said ring to said horizontal plate and forming a frusto-conical garment guide.

11. A garment steamer comprising a vessel having a bottom and side walls but open to the atmosphere at the top, a steam source connected to said vessel whereby the steam from said source escapes through the open top of the vessel, a horizontal plate mounted on the vessel in vertically spaced relation to the open top thereof to spread steam ascending from the vessel, a ring mounted on and encircling the vessel in radially spaced relation thereto, and upwardly converging filaments extending from the ring to the horizontal plate and forming a frusto-conical garment guide.

12. A garment steamer comprising a vessel having a bottom and side walls but open to the atmosphere on the top, means for introducing steam and condensate into said vessel, means for heating the condensate in the bottom of the vessel to convert same into steam, a horizontal plate mounted on the vessel in vertically spaced relation to the open top thereof to spread steam ascending from the vessel, a ring mounted on and encircling the vessel in radially spaced relation thereto, and upwardly converging filaments extending from the ring to the horizontal plate and forming a frusto-conical garment guide.

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